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BUILDING LEAN FROM DAY ONE: CONSIDERATIONS FOR GREENFIELD OPPORTUNITIES

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ACROSS ALL INDUSTRIES, MANUFACTURERS WHO APPLY LEAN MANAGEMENT PRINCIPLES ENJOY SIGNIFICANT COMPETITIVE ADVANTAGES IN GETTING PRODUCTS TO MARKET, REDUCING COSTS AND MEETING CUSTOMER EXPECTATIONS. "MOST COMMONLY, WE THINK OF INTRODUCING LEAN INTO AN EXISTING PLANT OR MANUFACTURING FACILITY," SAYS PATRICK WIEBUSCH, CO-FOUNDER & MANAGING PARTNER AT FOUR PRINCIPLES.

"But there is also the possibility of applying Lean thinking when an organization has the opportunity to build a brand-new facility. In our view, such 'greenfield' projects present incredibly valuable prospects for optimizing value, achieving efficiencies and gaining competitive positioning. At the same time, building a Lean facility from the ground up comes hand-in-hand with unique challenges."

Here we'll examine several key considerations when applying Lean management principles to a greenfield project, including the challenges of creating an ideal-state design and moving from planning to implementation. We'll begin by exploring the decision between building a greenfield plant or pursuing improvements in an existing facility (often one that is underutilized or inefficient) also known as a "brownfield" project.

WEIGHING GREENFIELD VERSUS BROWNFIELD: RECOGNIZING THE LEAN OPPORTUNITIES

The principles of Lean thinking can come into play well before a greenfield project officially begins. In fact, weighing the decision between pursing a greenfield versus brownfield project ideally involves a keen understanding of value from the customer's perspective and is geared toward optimizing that value; the decision should be based on a long-term commitment to continuous, transformative improvement.

While it may be true that a greenfield development could require more resources, time and investment in terms of infrastructure and design, "It takes a lot less effort on our part to get the job done right from the beginning than it does to do kaizen...to get it right much later," notes Jim Womack, Chairman and Founder of Lean Enterprise Institute, Inc.

As an example, consider the decision-making process of refractory products manufacturer Harbison Walker International (HWI). In 2017, the company announced plans to build a new $30 million manufacturing plant along the Kentucky-Ohio border.

"Location was a major factor in the decision to move forward with a greenfield site. Also, while value stream mapping can be and is utilized at other sites in the HWI network, building from the ground up provided the opportunity to use other tools and techniques to optimize material flow and reduce other wastes such as travel time, over-processing, etc.

Perhaps even more exciting in building a new facility is the opportunity to look at and improve all aspects of the manufacturing process on an immediate basis. This includes everything from outsourcing raw material grinding and sizing to a nearby supplier to improve efficiencies, while reducing transportation costs to even internal processes like plant planning and scheduling, autonomous maintenance, process control, etc.

While many such activities will eventually be leveraged to all sites across the HWI network, a greenfield site provides the opportunity to establish a benchmark site for others to learn from." – Douglas Hall, Senior Vice President for Integrated Supply Chain

The HWI example highlights many of the potential advantages of a greenfield development, including maximum design flexibility, opportunity to improve efficiency and ability to reduce required maintenance— all advantages which Lean thinking is inherently designed to optimize.

CHOOSING GREENFIELD: APPLYING LEAN THINKING FROM THE START

Once the decision has been made to undertake a greenfield development, the process of creating a Lean facility from the bottom up begins in earnest.

What is a Lean facility? What is the end goal?

A lean manufacturing facility is characterized by a seamless flow of people, material and information. A successfully designed Lean location features a safe, clean environment that expedites work and fosters a positive effect on workforce morale. Above all, a Lean facility encourages and ensures the effective use of time and resources.

The following features are commonly present in facilities that embrace Lean thinking: independent departments, decentralized support activities which sustain problem solving and continuous improvement activities, and modular and scalable factory features which allow ease in continuous improvement in factory layout.

Building a Lean facility from scratch typically includes several project rollout phases:

- *Map current-state and ideal-state processes* – Described in more detail below, this phase includes "baselining" the current state and determining "future-state" mapping. The overarching goal is to discover what the entity overall and the facility in particular need and should deliver. Lean thinking is fundamental to this phase, as the concept of value stream mapping and understanding the customer journey take center stage..

- *Formulate a strategy* – The phase represents the joining together of current state, ideal state and the unique conditions at the new site to create an actionable, in-scope design. Design flows that must be strategically (and realistically) considered include staff selection, management of raw materials and waste, the customer consumption process and experience, and the daily work experience of staff at the new facility.

- *Model the process* – Given that the costs associated with greenfield implementation can be high, many companies choose to model their chosen design and process. Modeling reduces the gap between action and result, allowing for successful iterations and better outcomes. The application of Lean thinking during the modeling phase ensures that the chosen design pulls value through the process, avoids defects and delivers one-piece flow—principles geared towards increasing value to the customer and improving efficiency. For example, a model can show the impact of running two eight-hour shifts versus three, as it pertains to production output and end-of-shift inventory levels.

- *Create a blueprint for implementation* – Based on the results of the modeling efforts, the subsequent blueprint defines precisely each step necessary for successful implementation.

- *Move from design to production* – Described in more detail below, the final step consists of crossing the bridge from design to implementation, a phase that requires careful attention to human infrastructure and resources.

Key consideration: Ideal-state and current-state mapping

The early phases of a Lean greenfield development are focused on the creation of a detailed current state and ideal state. Once these states are determined, the project team can move forward in clarifying how to close the gap between the states.

"The ideal state has many important benefits. First, the vision to which everyone should aspire is very clear. Second, it highlights weaknesses and makes them explicit, focusing the groups attention to resolve the weaknesses. Third, it creates a documented history and vision which makes it easier to communicate to outsiders and to new insiders what the group is trying to achieve." – Jamie W. Flinchbaugh, Massachusetts Institute of Technology, Sloan School of Management, Department of Mechanical Engineering.

As an example, consider Virtua Health, a not-for-profit, multihospital healthcare organization with more than 7,200 clinical and administrative personnel and 1,800 physicians as medical staff members. With Lean a part of its culture since 1998, Virtua set out to build a greenfield campus in 2007.

Tasked with "designing around process," the project's architects, management engineers, information technologists and multidisciplinary user groups employed a research-based process to understand current processes and define the future-state flow. Future-state planning consisted of multiple methods, including site visit research. The team identified several newly constructed "best practice" sites which it thoroughly researched. These efforts helped to provide external insight and perspective for the planning process. Specifically, the research proved the value of standardization in room layout for patient and staff safety—a concept that was ultimately applied and implemented in the new design.

In terms of current-state mapping, the Virtua project team relied on Lean concepts to integrate detailed process observations, value stream mapping, value analysis and improvement opportunity assessment. For instance, the project team collected data and charted travel distances for the flow of clinicians, physicians and patients. The mapping helped identify multiple wastes in the current process, including waiting, queues, transfers and under-utilization. Of these wastes, several were identified as a direct result of current facility design and were remedied in the new design.

Key consideration: Moving from design to production and the role of human infrastructure

"When it comes to implementation, the hand-off of responsibility from the design team to the production group is critical in a greenfield project," notes James Ryan, Principal at Four Principals. "If the transition isn't orchestrated successfully, the production group will likely struggle to fully implement the efforts of the design team. Human infrastructure must be a key focus during this hand-off, as it is a key component of reducing the risk in this phase."

According to research published by the Massachusetts Institute of Technology, "A well-developed training plan, on-line coaching and [rolling out] organizational changes before launch can all help alleviate the risks. The issue of implementing the factory is as critical as designing the factory."

The research notes that greenfield project teams should identify opportunities to launch organizational changes ahead of time that do not require the new factory to be in full operation. For example, the management can get a head start with re-organizing staff into semi-autonomous teams, delivering safety training and implementing rapid problem-solving techniques. Ultimately, the organization must strike the right balance between the need to ramp-up to full production quickly and efficiency at the new facility, while also supporting learning within the new facility, which impacts the long-term success of the facility in terms of safety, quality and cost.

APPLYING LEAN GREENFIELD THINKING TO START-UPS

Much of the value that can be captured by applying Lean thinking to greenfield projects can also be captured in a start-up environment. Launching a new enterprise--whether an entirely new small business or a small new segment within an existing company--demands a similar design and implementation process as is required to open a new manufacturing facility. In both scenarios, Lean principles can help ensure maximum payoff by emphasizing value stream mapping, prioritizing the customer and identifying the right balance between learning and execution. Similar to a new manufacturing plant, a start-up that successfully applies Lean thinking will be well positioned to thrive: Employees at all levels will seek to efficiently meet customer needs, all team members will appreciate the organization's vision, and problems will be viewed as opportunities to make the enterprise even stronger.

For companies poised to embark on a greenfield project or launch a new endeavor, Four Principles is here to deliver tangible Lean Management expertise, not idle talk. We develop sustainable Lean solutions across various industries and in countries around the world. We implement. We are passionate about what we do. We are Lean experts. Learn more at https://fourprinciples.com/

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Tel: +971 4 3682124
Email: info@fourprinciples.com

UAE Office Address
Dubai Media City
Building 8
Office 212
P.O. Box 502621
Dubai, UAE